Project Title

"Design and Implementation of a Digital Elevator Controller Using Sequential Circuits"

Objective

Design a digital system to control the movement of an elevator between multiple floors using sequential circuits and finite state machines (FSMs).

Description

1. **Introduction**
   - The project involves designing a circuit to simulate an elevator system for a building with up to 4 floors.
   - The system responds to user inputs (buttons for each floor) and moves the elevator up or down accordingly, while displaying the current floor on a 7-segment display.

---

2. **Main Steps**

a. Functional Analysis

   - Define the main functionalities:
     - Floor selection using input buttons.
     - Display the current floor on a 7-segment display.
     - Control the direction of movement (up/down).
     - Stop the elevator when it reaches the desired floor.
   - Define the states for the FSM:
     - **Idle State**: Wait for a button press.
     - **Move Up State**: Elevator moves up.
     - **Move Down State**: Elevator moves down.
     - **Stop State**: Elevator stops at the selected floor.

b. Component Selection

   - **Flip-Flops**: Store the current floor and control the FSM states.
   - **Counters**: Keep track of the current floor number.
   - **7-Segment Decoder**: Convert binary floor data to a displayable format.
   - **Logic Gates**: Implement the state transition logic and movement control.
   - **Clock**: Generate timing signals for the system.

c. Circuit Design

   - Create a state diagram for the FSM to handle floor requests.

- Implement the movement control logic:
    - Compare the current floor with the requested floor.
    - Determine whether to move up, down, or stay idle.
- Add inputs (buttons) for floor selection and LEDs to indicate elevator status.
- Draw the schematic.

d. Simulation

- You can use **Logisim** simulator tool to draw and check the behaviour of the proposed circuit